



SEQUENCE LISTING

<110> James M. Hogle
Harmon J. Zuccola
David Filman
Carl Elkin

<120> Oligomerization of Hepatitis Delta
Antigen

<130> 0725.1056-001

<140> 09/347,175
<141> 1999-07-01

<150> 60/091,609
<151> 1998-07-02

<160> 35

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 49
<212> PRT
<213> Hepatitis Delta Virus

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1 5 10 15
Glu Glu Leu Glu Arg Asp Leu Arg Lys Leu Lys Lys Lys Ile Lys Lys
20 25 30
Leu Glu Glu Asp Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly
35 40 45
Lys

<210> 2
<211> 49
<212> PRT
<213> Hepatitis Delta Virus

<400> 2
Gly Arg Glu Glu Val Leu Glu Gln Trp Val Asn Ser Arg Lys Lys Ala
1 5 10 15
Glu Glu Leu Glu Arg Asp Leu Arg Lys Thr Lys Lys Lys Ile Lys Lys
20 25 30
Leu Glu Asp Asp Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Leu Gly
35 40 45
Lys

<210> 3
 <211> 49
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 3
 Gly Arg Glu Glu Val Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Val Lys Lys Lys Ile Lys Lys
 20 25 30
 Leu Glu Asp Glu His Pro Trp Leu Gly Asn Ile Lys Gly Ile Leu Gly
 35 40 45
 Lys

<210> 4
 <211> 49
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 4
 Gly Arg Glu Glu Val Leu Glu Gln Trp Val Ala Gly Arg Arg Lys Gln
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Thr Lys Lys Lys Ile Lys Lys
 20 25 30
 Leu Glu Glu Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Leu Gly
 35 40 45
 Lys

<210> 5
 <211> 48
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 5
 Thr Arg Glu Glu Thr Leu Glu Lys Trp Ile Thr Ala Arg Lys Lys Ala
 1 5 10 15
 Glu Glu Leu Glu Lys Asp Leu Arg Lys Thr Arg Lys Thr Ile Lys Lys
 20 25 30
 Leu Glu Glu Asn Pro Trp Leu Gly Asn Ile Val Gly Ile Ile Arg
 35 40 45

<210> 6
 <211> 48
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 6
 Thr Arg Glu Glu Thr Leu Glu Lys Trp Ile Thr Ala Arg Lys Lys Ala
 1 5 10 15
 Glu Glu Leu Glu Lys Asp Leu Arg Lys Ala Arg Lys Thr Ile Lys Lys
 20 25 30
 Leu Glu Glu Asn Pro Trp Leu Gly Asn Ile Leu Gly Ile Ile Arg
 35 40 45

<210> 7
 <211> 49
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 7
 Gly Arg Glu Gln Ile Leu Glu Gln Trp Val Asp Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Ile Lys Lys Lys Ile Lys Lys
 20 25 30
 Leu Glu Glu Glu Asn Pro Trp Leu Gly Asn Val Lys Gly Ile Leu Gly
 35 40 45
 Lys

<210> 8
 <211> 49
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 8
 Gly Arg Glu Glu Ile Leu Glu Gln Trp Val Ala Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Thr Lys Lys Lys Leu Lys Lys
 20 25 30
 Ile Glu Asp Glu Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Leu Gly
 35 40 45
 Lys

<210> 9
 <211> 37
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Residues 12-48 of delta 12-60 (Y)

<400> 9
 Gly Arg Glu Asp Ile Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Leu Lys Lys Lys Ile Lys Lys
 20 25 30
 Leu Glu Glu Asp Asn
 35

<210> 10
 <211> 604
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic Gene for Optimized Expression of HDAg-S
 in E. Coli

<221> CDS

<222> (7)...(591)

<400> 10

gggcat atg agc cgt agc gaa cgt cgt aaa gat cgt ggc ggc cgt gaa 48
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu

1 5 10

gat att ctg gaa cag tgg gtg agc ggc cgt aag aag tta gag gaa ttg 96
 Asp Ile Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu
 15 20 25 30

gaa cgt gat ctg cgt aaa ctg aaa aag aag att aag aaa ctg gaa gaa 144
 Glu Arg Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu
 35 40 45

gat aac ccg tgg ttg ggt aat att aaa ggc att att ggc aag aaa gat 192
 Asp Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp
 50 55 60

aaa gat ggc gaa ggc gcg ccg ccg gcg aag aaa ctg cgt atg gat cag 240
 Lys Asp Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln
 65 70 75

atg gaa att gat gcg ggc ccg cgt aaa cgt ccg ctg cgt ggc ggc ttt 288
 Met Glu Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe
 80 85 90

acc gat aag gaa cgt cag gac cat cgt cgt aaa gcg ctg gaa aac 336
 Thr Asp Lys Glu Arg Gln Asp His Arg Arg Lys Ala Leu Glu Asn
 95 100 105 110

aaa cgt aaa cag ctg agc agc ggc ggc aaa tct ctg agc cgt gaa gaa 384
 Lys Arg Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu
 115 120 125

gaa gaa gaa ctg aaa cgt ctg acc gaa gaa gat gaa aaa cgt gaa cgt 432
 Glu Glu Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg
 130 135 140

cgt att gca ggt cca tct gtt ggt ggt gtg aac ccg ctg gaa ggc ggc 480
 Arg Ile Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly
 145 150 155

agc cgt ggt gca ccg ggc ggt ggc ttt gtg ccg tct atg caa ggt gtt 528
 Ser Arg Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val
 160 165 170

cca gaa agc ccg ttt gcg cgt acc ggc gaa ggc ctg gat att cgt ggc 576
 Pro Glu Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly
 175 180 185 190

agc cag ggc ttt ccg taaaccatgg cgc 604
 Ser Gln Gly Phe Pro
 195

<210> 11

<211> 195

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence encoded by synthetic Gene for
Optimized Expression of HDAg-S in E. Coli

<400> 11

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1				5					10				15		
Leu	Glu	Gln	Trp	Val	Ser	Gly	Arg	Lys	Lys	Leu	Glu	Glu	Leu	Glu	Arg
									20		25		30		
Asp	Leu	Arg	Lys	Leu	Lys	Lys	Ile	Lys	Lys	Leu	Glu	Glu	Asp	Asn	
							35		40			45			
Pro	Trp	Leu	Gly	Asn	Ile	Lys	Gly	Ile	Ile	Gly	Lys	Lys	Asp	Lys	Asp
							50		55			60			
Gly	Glu	Gly	Ala	Pro	Pro	Ala	Lys	Lys	Leu	Arg	Met	Asp	Gln	Met	Glu
							65		70		75		80		
Ile	Asp	Ala	Gly	Pro	Arg	Lys	Arg	Pro	Leu	Arg	Gly	Gly	Phe	Thr	Asp
							85			90			95		
Lys	Glu	Arg	Gln	Asp	His	Arg	Arg	Arg	Lys	Ala	Leu	Glu	Asn	Lys	Arg
							100		105			110			
Lys	Gln	Leu	Ser	Ser	Gly	Gly	Lys	Ser	Leu	Ser	Arg	Glu	Glu	Glu	
							115		120			125			
Glu	Leu	Lys	Arg	Leu	Thr	Glu	Glu	Asp	Glu	Lys	Arg	Glu	Arg	Arg	Ile
							130		135			140			
Ala	Gly	Pro	Ser	Val	Gly	Gly	Val	Asn	Pro	Leu	Glu	Gly	Ser	Arg	
							145		150			155			160
Gly	Ala	Pro	Gly	Gly	Phe	Val	Pro	Ser	Met	Gln	Gly	Val	Pro	Glu	
							165			170			175		
Ser	Pro	Phe	Ala	Arg	Thr	Gly	Gly	Leu	Asp	Ile	Arg	Gly	Ser	Gln	
							180			185			190		
Gly	Phe	Pro													
		195													

<210> 12

<211> 1679

<212> DNA

<213> Hepatitis Delta Virus

<400> 12

cttgagccaa	gttccgagcg	aggagacgcg	gggggaggat	cagctccga	gagggatgt	60
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ggaagcggac	gagatccccca	caacgcccga	gaatctctgg	aaggggaaag	aggaaggtgg	180
aagaaaaaagg	ggcgggcctc	ccgatcccgag	gggccaacc	tccagatctg	gagagcactc	240
cggcccgaag	ggtttagtag	cacccagagg	gaggaatcca	ctcgagatg	agcagagaaa	300
tcacctccag	aggacccctt	cagcgaacaa	gaggcgcttc	gagcggtagg	agtaagacca	360
tagcgatagg	aggagatgct	aggataggg	ggagaccgaa	gcgaggagga	aagtaaagaa	420
agcaacgggg	ctagccgtg	ggttccgc	cccccgagag	gggacgagtg	aggcttatcc	480
cggggaaattc	gacttatctgt	ccccatctag	cgggacccc	gacccttc	gaaagtgacc	540
ggaggggggtg	ctggaaacac	cggggaccag	tggagccatg	ggatccct	cccgatgctc	600
gactccgact	ccccccccc	agggtcgccc	aggaatggcg	ggacccact	ctgcagggtc	660
cgcgttccat	cctttcttac	ctgatggccg	gcatggtccc	agcctcctcg	ctggcgccgg	720
ctgggcaaca	ttccgagggg	accgtccc	cgtaatggc	aatgggacc	cacaatctc	780
tctagattcc	gatagagaat	cgagagaaaa	gtggctctcc	cttagccatc	cgagtggacg	840
tgcgtcctcc	ttcggatgcc	caggtcgac	cgcgaggagg	tggagatgcc	atgccgaccc	900
gaagagggaaa	gaaggacgcg	agacgcaaac	ctgtgagtgg	aaaccgcgtt	tattcactgg	960
ggtcgacaac	tctggggaga	aaaggcgcga	tcggctggga	agagtatatac	ccatggaaat	1020

ccctggtttc ccctgatgtc cagcccccc cccgtccgag agaaggggga ctccggact 1080
 ccctgcagac tggggacgaa gccgcggccg ggcgtcccc tcgatccacc ttcgaggggg 1140
 ttcacaccccc caaccggcgg gccggctact cttcttccc ttctctcgtc ttctcggtc 1200
 aacctctga gttcctcttc ttcctcttg ctgaggtct tgcctcccg cgatagctgc 1260
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 ctctcgccg ggggagcccc ctctccatcc ttatcctctt ttccgagaat tccttgatg 1440
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 tctctctcga gttcctctaa cttcttctt cggccaccc actgctcgag gatctttct 1560
 ctccccccgc ggttcttcct cgactcggac cggctcatct cggctagagg cggcagtcct 1620
 cagtaactctt actctttctt gtaaaagagga gactgctgga ctgcggcccc gagcccgag 1679

<210> 13
 <211> 1683
 <212> DNA
 <213> Hepatitis Delta Virus

<400> 13

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 aagaagcggaa agaattcccc ataacgctag tgaaactcta ggaaggaaaa agaggtgcga 180
 tgaaaaaaga ggaggtgggc ctcccgatcc gaggtcccg gtggcaagt ttggaggaca 240
 ctccggcccg aagggtttag gatccccag agggaggaag ccacacggag tagaacagag 300
 aaatcacctc cagaggaccc cttcagcggaa cagagggcg catcgcgaga gggagtagac 360
 catagcgatg ggaggggatg cttaggatg tggagatg aagcgaggag gaaagtaaag 420
 agagcagcgg ggctagtcgg tgggtgttcc gccccccgag agggagcgg tgaggcttat 480
 cccggggaaat tcgacttatac gtccccacat agcagagccc cggacccct ttcaaagcga 540
 ccgaggggggg tgactttgaa cattggggac cagtgagcc atggatgct cctcccgatt 600
 ccgccccaaac tcctttcccc ccaagggtcg cccaggaatg gccccccccc actctgcagg 660
 gtccgcgttc catccttct tacctgatgg cccgcatggt cccagcctcc tcgctggcgc 720
 cgctggcga acattcccgag gggaccgtcc cctcggtaat ggcgaatggg acgcacaaat 780
 ctctctagct tcccagagag aagcgagaga aaagtggctc tcccttgcc atccgagtgg 840
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 cccgaagagg aaagaaggac gcgagacgca aacctgtgag tggaaacccg ctttattcac 960
 tgggtcgac aactctgggg agagaaggaa gggtcggtg ggaagagat atcccatggg 1020
 aatccctggc ttccccttat gtccagtc tccccgggtcc gagcgaaggg ggactccggg 1080
 actccttgca tgctggggac gaagccgcgg cccggcgctc ccctcgatcc accttcgagg 1140
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 gtcaacctct taagttcctc ttccctctcc ctgctqaggc tctttcccc cgcacgatagc 1260
 tgcttcctct tggtctcgag ggccttcctt cgtcggtat cctgccttc cttgtcggtg 1320
 aatcctcccc tgagaggctt cttccttagt ccggcgctca tctccatctg gtccatccgg 1380
 agtttcttcg cgggggggtgc cccctctcca tccttatacct tctttccgat tattccttg 1440
 atgtttccca gccaggatt gtcttcctct agtttctga ttttctttaa taactccgg 1500
 aggtctctct cggatccctc taacttctt cttccgctca cccactgctc gaggatgtct 1560
 tccctccccc cgggtcttt cttctttcg gaccggctca tcttcgacta gaggcgacgg 1620
 tcctcagtagac tcttactctt ttctgtaaag aggagactgc tggccctgtc gcccaagctc 1680
 gag

<210> 14
 <211> 645
 <212> DNA
 <213> Hepatitis Delta Virus

<220>
 <221> CDS
 <222> (1)...(642)

<400> 14
 atg agc cgg tcc gaa aga agg aaa gac cgc ggg ggg agg gaa gac atc 48
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
 1 5 10 15

ctc gag cag tgg gtg agc gga aga aag aag tta gag gaa ctc gag aga 96
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30

gac ctc cgg aag tta aag aag aaa atc aag aaa cta gag gaa gac aat 144
 Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
 35 40 45

ccc tgg ctg gga aac atc aaa gga ata atc gga aag aag gat aag gat 192
 Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
 50 55 60

gga gag ggg gca ccc ccg gcg aag aag ctc cgg atg gac cag atg gag 240
 Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
 65 70 75 80

ata gac gcc gga cct agg aag agg cct ctc agg gga gga ttc acc gac 288
 Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
 85 90 95

aag gag agg cag gat cac cga cga agg aag gcc ctc gag aac aag agg 336
 Lys Glu Arg Gln Asp His Arg Arg Lys Ala Leu Glu Asn Lys Arg
 100 105 110

aag cag cta tcg tcg ggg gga aag agc ctc agc agg gag gag gaa gag 384
 Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
 115 120 125

gaa ctt aag agg ttg acc gag gaa gac gag aaa agg gaa aga aga ata 432
 Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile
 130 135 140

gcc ggc ccg tcg gtt ggg ggt gtg aac ccc ctc gaa ggt gga tcg agg 480
 Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly Ser Arg
 145 150 155 160

gga gcg ccc ggg ggc ggc ttc gtc ccc agc atg caa gga gtc ccg gag 528
 Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu
 165 170 175

tcc ccc ttc gct cgg acc ggg gag gga ctg gac ata agg gga agc cag 576
 Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln
 180 185 190

gga ttc cca tgg gat ata ctc ttc cca gcc gac cct ccc ttc tct ccc 624
 Gly Phe Pro Trp Asp Ile Leu Phe Pro Ala Asp Pro Pro Phe Ser Pro
 195 200 205

cag agt tgt cga ccc cag tga 645
 Gln Ser Cys Arg Pro Gln
 210

<210> 15
 <211> 214
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 15
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
 1 5 10 15
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30
 Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
 35 40 45
 Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
 50 55 60
 Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
 65 70 75 80
 Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
 85 90 95
 Lys Glu Arg Gln Asp His Arg Arg Arg Lys Ala Leu Glu Asn Lys Arg
 100 105 110
 Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
 115 120 125
 Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile
 130 135 140
 Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Ser Arg
 145 150 155 160
 Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu
 165 170 175
 Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln
 180 185 190
 Gly Phe Pro Trp Asp Ile Leu Phe Pro Ala Asp Pro Pro Phe Ser Pro
 195 200 205
 Gln Ser Cys Arg Pro Gln
 210

<210> 16
 <211> 214
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 16
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
 1 5 10 15
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30
 Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
 35 40 45
 Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
 50 55 60
 Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
 65 70 75 80
 Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
 85 90 95
 Lys Glu Arg Gln Asp His Arg Arg Arg Lys Ala Leu Glu Asn Lys Arg
 100 105 110
 Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
 115 120 125

Glu	Leu	Lys	Arg	Leu	Thr	Glu	Glu	Asp	Glu	Lys	Arg	Glu	Arg	Arg	Ile
130						135				140					
Ala	Gly	Pro	Ser	Val	Gly	Gly	Val	Asn	Pro	Leu	Glu	Gly	Gly	Ser	Arg
145					150					155					160
Gly	Ala	Pro	Gly	Gly	Gly	Pro	Val	Pro	Ser	Met	Gln	Gly	Val	Pro	Glu
					165				170				175		
Ser	Pro	Phe	Ala	Arg	Thr	Gly	Gly	Leu	Asp	Ile	Arg	Gly	Ser	Gln	
					180			185			190				
Gly	Phe	Pro	Trp	Asp	Ile	Leu	Phe	Pro	Ala	Asp	Pro	Pro	Phe	Ser	Pro
					195			200			205				
Gln	Ser	Cys	Arg	Pro	Gln										
					210										

<210> 17
 <211> 214
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 17															
Met	Ser	Arg	Ser	Glu	Ser	Arg	Lys	Asn	Arg	Gly	Gly	Arg	Glu	Glu	Ile
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Leu	Glu	Gln	Trp	Val	Ala	Gly	Arg	Lys	Lys	Leu	Glu	Glu	Leu	Glu	Arg
				20				25				30			
Asp	Leu	Arg	Lys	Thr	Lys	Lys	Lys	Leu	Lys	Lys	Ile	Glu	Asp	Glu	Asn
			35				40				45				
Pro	Trp	Leu	Gly	Asn	Ile	Lys	Gly	Ile	Leu	Gly	Lys	Lys	Asp	Lys	Asp
				50		55				60					
Gly	Glu	Gly	Ala	Pro	Pro	Ala	Lys	Arg	Ala	Arg	Thr	Asp	Gln	Met	Glu
65					70			75			80				
Val	Asp	Ser	Gly	Pro	Arg	Lys	Arg	Pro	Leu	Arg	Gly	Gly	Phe	Thr	Asp
					85			90			95				
Lys	Glu	Arg	Gln	Asp	His	Arg	Arg	Arg	Lys	Ala	Leu	Glu	Asn	Lys	Lys
					100			105			110				
Lys	Gln	Leu	Ser	Ala	Gly	Gly	Lys	Asn	Leu	Ser	Lys	Glu	Glu	Glu	Glu
					115			120			125				
Glu	Leu	Arg	Arg	Leu	Thr	Glu	Glu	Asp	Glu	Arg	Arg	Glu	Arg	Arg	Val
					130			135			140				
Ala	Gly	Pro	Pro	Val	Gly	Gly	Val	Asn	Pro	Leu	Glu	Gly	Ser	Arg	
145					150				155			160			
Gly	Ala	Pro	Gly	Gly	Gly	Pro	Val	Pro	Ser	Leu	Gln	Gly	Val	Pro	Glu
					165				170			175			
Ser	Pro	Phe	Ser	Arg	Thr	Gly	Gly	Leu	Asp	Ile	Arg	Gly	Asn	Gln	
					180			185			190				
Gly	Phe	Pro	Trp	Asp	Ile	Leu	Phe	Pro	Ala	Asp	Pro	Pro	Phe	Ser	Pro
					195			200			205				
Gln	Ser	Cys	Arg	Pro	Gln										
					210										

<210> 18
 <211> 37
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic peptide from the multimer-forming domain of HDAG

<400> 18
 Lys Lys Leu Glu Glu Leu Glu Arg Asp Leu Arg Lys Leu Lys Lys Lys
 1 5 10 15
 Ile Lys Lys Leu Glu Glu Asp Asn Pro Trp Leu Gly Asn Ile Lys Gly
 20 25 30
 Ile Ile Gly Lys Tyr
 35

<210> 19
 <211> 38
 <212> PRT
 <213> Hepatitis Delta Virus

<220>
 <223> Synthetic peptide from the multimer-forming domain of HDAg

<400> 19
 Gly Arg Glu Asp Ile Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Leu Lys Lys Lys Ile Lys Lys
 20 25 30

Leu Glu Glu Asp Asn Pro
 35

<210> 20
 <211> 50
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic peptide from the multimer-forming domain of HDAg

<400> 20
 Gly Arg Glu Asp Ile Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu
 1 5 10 15
 Glu Glu Leu Glu Arg Asp Leu Arg Lys Leu Lys Lys Lys Ile Lys Lys
 20 25 30
 Leu Glu Glu Asp Asn Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly
 35 40 45
 Lys Tyr
 50

<210> 21
 <211> 598
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic HDAg gene for optimized expression in E. Coli

<221> CDS
 <222> (1)...(585)

<400> 21
atg agc cgt agc gaa cgt cgt aaa gat cgt ggc ggc cgt gaa gat att 48
Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
1 5 10 15

ctg gaa cag tgg gtg agc ggc cgt aag aag tta gag gaa ttg gaa cgt 96
Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
20 25 30

gat ctg cgt aaa ctg aaa aag aag att aag aaa ctg gaa gaa gat aac 144
Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
35 40 45

ccg tgg ttg ggt aat att aaa ggc att att ggc aag aaa gat aaa gat 192
Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
50 55 60

ggc gaa ggc gcg ccg ccg gcg aag aaa ctg cgt atg gat cag atg gaa 240
Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
65 70 75 80

att gat gcg ggc ccg cgt aaa cgt ccg ctg cgt ggc ggc ttt acc gat 288
Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
85 90 95

aag gaa cgt cag gac cat cgt cgt aaa gcg ctg gaa aac aaa cgt 336
Lys Glu Arg Gln Asp His Arg Arg Lys Ala Leu Glu Asn Lys Arg
100 105 110

aaa cag ctg agc agc ggc ggc aaa tct ctg agc cgt gaa gaa gaa gaa 384
Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
115 120 125

gaa ctg aaa cgt ctg acc gaa gaa gat gaa aaa cgt gaa cgt cgt att 432
Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile
130 135 140

gca ggt cca tct gtt ggt ggt gtg aac ccg ctg gaa ggc ggc agc cgt 480
Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly Ser Arg
145 150 155 160

ggt gca ccg ggc ggt ggc ttt gtg ccg tct atg caa ggt gtt cca gaa 528
Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu
165 170 175

agc ccg ttt gcg cgt acc ggc gaa ggc ctg gat att cgt ggc agc cag 576
Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln
180 185 190

ggc ttt ccg taaaccatgg cgc 598
Gly Phe Pro
195

<210> 22
<211> 195
<212> PRT
<213> Artificial Sequence

<220>

<223> Amino acid sequence encoded by synthetic gene for optimized HDAg expression in E. Coli

<400> 22

<210> 23

<211> 598

<212> DNA

<213> Hepatitis Delta Virus

<220>

<221> CDS

<222> (1)...(598)

<400> 23

atg agc cg ^g tcc gaa aga agg aaa gac cgc ggg ggg agg gaa gac atc	48
Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile	
1 5 10 15	

ctc gag cag tgg gtg agc gga aga aag aag tta gag gaa ctc gag aga 96
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30

gac ctc cg ^g aag tta aag aag aaa atc aag aaa cta gag gaa gac aat	144	
Asp Leu Arg Lys Leu Lys Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn		
35	40	45

ccc tgg ctg gga aac atc aaa gga ata atc gga aag aag gat aag gat	192
Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp	
50 55 60	

gga gag ggg gca ccc ccg gcg aag aag ctc cgg atg gac cag atg gag	240
Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu	
65 70 75 80	
ata gac gcc gga cct agg aag agg cct ctc agg gga gga ttc acc gac	288
Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp	
85 90 95	
aag gag agg cag gat cac cga cga agg aag gcc ctc gag aac aag agg	336
Lys Glu Arg Gln Asp His Arg Arg Lys Ala Leu Glu Asn Lys Arg	
100 105 110	
aag cag cta tcg tcg ggg gga aag agc ctc agc agg gag gag gaa gag	384
Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu	
115 120 125	
gaa ctt aag agg ttg acc gag gaa gac gag aaa agg gaa aga aga aga ata	432
Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile	
130 135 140	
gcc ggc ccg tcg gtt ggg ggt gtg aac ccc ctc gaa ggt gga tcg agg	480
Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly Ser Arg	
145 150 155 160	
gga gcg ccc ggg ggc ggc ttc gtc ccc agc atg caa gga gtc ccg gag	528
Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu	
165 170 175	
tcc ccc ttc gct cgg acc ggg gag gga ctg gac ata agg gga agc cag	576
Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln	
180 185 190	
gga ttc cca tgg gat ata ctc t	598
Gly Phe Pro Trp Asp Ile Leu	
195	

<210> 24
 <211> 199
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 24
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
 1 5 10 15
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30
 Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
 35 40 45
 Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
 50 55 60
 Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
 65 70 75 80
 Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
 85 90 95
 Lys Glu Arg Gln Asp His Arg Arg Arg Lys Ala Leu Glu Asn Lys Arg
 100 105 110

Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
 115 120 125
 Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile
 130 135 140
 Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly Ser Arg
 145 150 155 160
 Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu
 165 170 175
 Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln
 180 185 190
 Gly Phe Pro Trp Asp Ile Leu
 195

<210> 25
 <211> 195
 <212> PRT
 <213> Hepatitis Delta Virus

<400> 25
 Met Ser Arg Ser Glu Arg Arg Lys Asp Arg Gly Gly Arg Glu Asp Ile
 1 5 10 15
 Leu Glu Gln Trp Val Ser Gly Arg Lys Lys Leu Glu Glu Leu Glu Arg
 20 25 30
 Asp Leu Arg Lys Leu Lys Lys Ile Lys Lys Leu Glu Glu Asp Asn
 35 40 45
 Pro Trp Leu Gly Asn Ile Lys Gly Ile Ile Gly Lys Lys Asp Lys Asp
 50 55 60
 Gly Glu Gly Ala Pro Pro Ala Lys Lys Leu Arg Met Asp Gln Met Glu
 65 70 75 80
 Ile Asp Ala Gly Pro Arg Lys Arg Pro Leu Arg Gly Gly Phe Thr Asp
 85 90 95
 Lys Glu Arg Gln Asp His Arg Arg Arg Lys Ala Leu Glu Asn Lys Arg
 100 105 110
 Lys Gln Leu Ser Ser Gly Gly Lys Ser Leu Ser Arg Glu Glu Glu Glu
 115 120 125
 Glu Leu Lys Arg Leu Thr Glu Glu Asp Glu Lys Arg Glu Arg Arg Ile
 130 135 140
 Ala Gly Pro Ser Val Gly Gly Val Asn Pro Leu Glu Gly Gly Ser Arg
 145 150 155 160
 Gly Ala Pro Gly Gly Phe Val Pro Ser Met Gln Gly Val Pro Glu
 165 170 175
 Ser Pro Phe Ala Arg Thr Gly Glu Gly Leu Asp Ile Arg Gly Ser Gln
 180 185 190
 Gly Phe Pro
 195

<210> 26
 <211> 93
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer

<400> 26
ggccatatga gccgttagcga acgtcgtaaa gatcgtggcg gccgtgaaga tattctggaa 60
cagtgggtga gcggccgtaa gaagtttagag gaa 93

<210> 27
<211> 95
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 27
atattaccca accacgggtt atcttcttcc agtttcttaa tcttctttt cagtttacgc 60
agatcacgtt ccaattcctc taacttctta cggcc 95

<210> 28
<211> 94
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 28
taaccctgtgg ttggtaata ttaaaggcat tattggcaag aaagataaaag atggcgaagg 60
cgcgcgcgcg gcgaagaaac tgcgtatgga tcag 94

<210> 29
<211> 94
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 29
gatggtcctg acgttcctta tcggtaaagc cgccacgcag cggacgttta cgcccccccg 60
catcaatttc catctgatcc atacgcgtt tctt 94

<210> 30
<211> 93
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 30
ataaggaacg tcaggaccat cgtcgctgta aagcgctgga aaacaaacgt aaacagctga 60
gcagcggcgg caaatctctg agccgtgaag aag 93

<210> 31
<211> 89
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 31
caacagatgg acctgcaata cgacgttac gttttcatac ttcttcggtc agacgttca 60
gttcttcttc ttcttcacgg ctcagatg 89

<210> 32
<211> 101
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 32
tattgcaggt ccatctgttg gtgggtgtgaa cccgctggaa ggcggcagcc gtggcgcc 60
ggcgccggc tttgtgccgt ctatgcaagg tggccagaa a 101

<210> 33
<211> 90
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 33
gcgcgcattgtt ttacggaaag ccctggctgc cacgaatatac caggcattcg ccgtacg 60
caaacgggct ttctgaaaca cttgcatacg 90

<210> 34
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 34
ggccatatga ggcgttagcga 20

<210> 35
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR Primer

<400> 35
gcgcgcattgtt ttacggaaag 20